

Al Roth's game theory and experimental economics page

Last updated 4/7/97...comments and suggested links welcome...alroth+@pitt.edu

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I am the A.W. Mellon Professor of Economics in the Department of Economics at the University of Pittsburgh. My research interests are in game theory as a part of empirical economics; and experimental economics.

You can scroll through this page, or jump to some of the following topic headings.

- very short introductory articles on bargaining, matching, and experimental economics.
- short articles on history, methodology, philosophy.
- abstracts, introductions, and excerpts of selected papers. [last updated 11/6/96]
 - The evolution of institutions in matching markets
 - Learning, and cognitive game theory
- Handbook of Experimental Economics (with detailed Tables of Contents and some reviews [last updated 10/24/96])
- Bibliographies (so far including bargaining experiments, matching models, and learning in games, as well as a computer science bibliography on minimax search in games and Matt Rabin's behavioral economics bibliography.) [last updated 4/7/97]
- The growing (consulting) business of economic design [last updated 9/24/96]
 - The National Resident Matching Program [last updated 12/9/96, to include the final report on the design and comparison phase of that project]
 - The FCC spectrum auctions
 - Design considerations for Internet and other electronic markets
 - Miscellaneous design projects (including some experiments)
- Things to participate in: Experiments on the web, tournaments, conferences [last updated 3/3/97]
- Other experimental servers
 - Other labs and experimenters [last updated 11/5/96]
 - Experiments in the classroom [last updated 8/9/96]
- Other game theory servers
 - Other pages on which game theory intersects with experiments [last updated 1/24/96]
 - Evolution, learning, and dynamics [last updated 3/31/97]
 - Game theory in the classroom [last updated 8/28/96]
 - Other servers devoted to game theory [last updated 3/10/97]
 - Miscellaneous game theory connections [last updated 3/31/97]
- Searchable abstracts of NSF grants
- Working paper archive
- Conduct in Science [last updated 4/25/96]
- Curriculum vita, and consulting services--Alvin E. Roth

For some very short introductory articles, see my encyclopedia articles on

- game-theoretic models of bargaining.
- two-sided matching models.
- experimental economics.

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Short papers on history, methodology, and philosophy

For some general exhortation regarding game theory as a part of empirical economics, see my article by that name in the Economic Journal:

- Game theory as a part of empirical economics.

For some discussion of why the experimental evidence from individual choice experiments is interpreted differently by many psychologists and many economists, see

- Individual rationality as a useful approximation.

For an account of the history of experimental economics from 1930 to 1960, see

- Early History of Experimental Economics.

For some methodological exhortation (on how we conduct and report experiments) see

- "Let's Keep the Con Out of Experimental Econ."

(see also Conduct in Science)

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Abstracts, Introductions and Excerpts of Selected Papers

Here are the introductions to and sometimes extended excerpts from some papers of mine (and some complete copies of short papers). At the end of each introduction are instructions for obtaining preprints or reprints of the whole paper. (NB: this section is still in progress, with more to come.)

There are two strands of my work which I think of as most having to do with making game theory a part of empirical economics. The first has to do with the evolution of market institutions in matching markets such as those found in labor markets for doctors, lawyers, etc. A central theme of this work has been that if we are to take game theory seriously, we must pay serious attention to systems of rules by which markets are organized, and how these evolve over time, as players adapt their behavior, and the rules are stressed and changed. (If you are an empirically oriented game theorist, rules are data!) Some of my more empirically oriented papers will be presented here under the heading **The evolution of institutions in matching markets.**

The second strand of my work has to do with taking seriously the observation that, both in the field and in the lab, players adapt their behavior as they learn about the game. Motivated in large part by a desire to explain laboratory results, Ido Erev and I have started to think about what game theory might look like if it were designed around a model of players with realistic cognitive limitations. These papers will be presented under the heading **Learning, and cognitive game theory.**

(I will in the not too distant future have abstracts and/or introductions up for each of the papers listed below.)

- **The evolution of institutions in matching markets**
 - Roth, A.E. "The Evolution of the Labor Market for Medical Interns and Residents: A Case Study in Game Theory", **Journal of Political Economy**, 92, 1984, 991-1016.
 - Roth, A.E. "New Physicians: A Natural Experiment in Market Organization," **Science**, 250, 1990, 1524-1528. (electronically reprinted in its entirety).
 - Roth, A.E. "A Natural Experiment in the Organization of Entry Level Labor Markets: Regional Markets for New Physicians and Surgeons in the U.K.", **American Economic Review**, vol. 81, June 1991, 415-440.
 - Mongell, S. and Roth, A.E. "Sorority Rush as a Two-Sided Matching Mechanism," **American Economic Review**, vol. 81, June 1991, 441-464.
 - Roth, A.E. and X. Xing "Jumping the Gun: Imperfections and Institutions Related to the Timing of Market Transactions," **American Economic Review**, 84, September, 1994, 992-1044.
 - Roth, A.E. "The NRMP as a Labor Market," **Journal of the American Medical**

Association, 275, April 3, 1996, 1054-1056. (this paper is reproduced here in its entirety)

- Roth, A.E. and X. Xing "Turnaround Time and Bottlenecks in Market Clearing: A Comparative Analysis of Labor Market Institutions." mimeo, January 1995, University of Pittsburgh

- **Learning, and cognitive game theory**

- Roth, A.E. and I. Erev "Learning in Extensive-Form Games: Experimental Data and Simple Dynamic Models in the Intermediate Term." **Games and Economic Behavior**, Special Issue: Nobel Symposium, vol. 8, January 1995, 164-212.
- Erev, I. and A.E. Roth "On the need for low rationality, cognitive game theory: Reinforcement learning in experimental games with unique, mixed strategy equilibria." mimeo, July 1995, University of Pittsburgh.
- Slonim, R. and A.E. Roth "Financial Incentives and Learning in Ultimatum and Market Games: An Experiment in the Slovak Republic," mimeo, August 1995.

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- [The Handbook of Experimental Economics](#), John H. Kagel and Alvin E. Roth, editors, Princeton University Press, 1995.

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(click on chapter headings for detailed contents)

[Preface](#)

- [1. Introduction to Experimental Economics](#) by Alvin E. Roth
- [2. Public Goods: A Survey of Experimental Research](#) by John O. Ledyard
- [3. Coordination Problems](#) by Jack Ochs
- [4. Bargaining Experiments](#) by Alvin E. Roth
- [Bibliography of bargaining experiments.](#)
- [5. Industrial Organization: A Survey of Laboratory Research](#) by Charles A. Holt
- [6. Experimental Asset Markets: A Survey](#) by Shyam Sunder
- [7. Auctions: A Survey of Experimental Research](#) by John H. Kagel
- [8. Individual Decision Making](#) by Colin Camerer

[Early reviews \(from the bookjacket...\)](#) by Ken Binmore, Robert Gibbons, Daniel Kahneman, Richard Thaler, and Ariel Rubinstein.

[Arijit Mukherji](#) at the U. of Minnesota has written an article length book review, which he has posted on his page (in MSWord format): [The Handbook of Experimental Economics: A Review Essay](#), **Behavioral Research in Accounting**, 1996, v8, 217-231.

The concluding paragraph of Mukherji's review says (p231):

"Laboratory experiments herald (or threaten) a radical change in the way economics is done. To ignore it is to be left behind."

[David Butler](#) of the University of Western Australia has posted his article length book review on the web in html format: "[The 'Experimental Economics' Experiment.](#)" **Journal of Economic Surveys**, 1996, v10, September, pp347-356.

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Bibliographies

It seems to me that, along with introductory materials for nonspecialists, bibliographies for specialists may be among the more useful things to put on a web page. Here (so far) are three evolving bibliographies of my own, and a link to two others.

- [Bibliography of bargaining experiments.](#) This bibliography began life as the bibliography of (my)

Chapter 4 of The Handbook of Experimental Economics, John H. Kagel and Alvin E. Roth, editors, Princeton University Press, 1995. I have since updated it somewhat, and would be glad to hear of further updates I should make.

- Bibliography of two-sided matching. This bibliography began life as the bibliography of Roth, A.E. and M. Sotomayor **Two-Sided Matching: A Study in Game-Theoretic Modeling and Analysis**, Econometric Society Monograph Series, Cambridge University Press, 1990. (Winner of the 1990 Lanchester Prize.) Paperback edition, 1992.

I've updated it sporadically, and would be glad to hear of missing references.

- Bibliography of Learning in Games. This bibliography is particularly incomplete, as the literature is growing fast. Please email me with missing items.

- "An incomplete list of (about 2000) Psychology and Economics citations." Compiled by Matthew Rabin.

- A Bibliography on Minimax Trees by Claude G. Diderich, of the Computer Science Department of the Swiss Federal Institute of Technology in Lausanne. (There is a downloadable postscript version on Diderich's home page.) This bibliography concerns the computer science literature of search in game trees.

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The emerging (consulting) business of economic design:

Economic institutions evolve, but they are also designed. Market makers and regulators, as well as entrepreneurs and managers, have always been involved to some extent in the design of economic institutions. And business consultants of all sorts have rushed in where economists feared to tread.

Game theory, the part of economics specifically concerned with the detailed rules and procedures which economic institutions consist of, has a lot to offer to this activity, in principle. But it has only been relatively recently that the depth and breadth of robust game theoretic knowledge has been sufficient so that game theorists can with some confidence offer practical advice on institutional design. (Game theoretic consulting until now has focused largely on giving strategic advice, e.g. in negotiation support, strategic planning, or in bidding; i.e. it has focused on how to behave in particular strategic environments which already exist.)

As robust knowledge accumulates, game theorists are increasingly in a position to offer advice on the design of economic institutions in environments which may still be too complex to prove theorems about. That is, the process of giving advice is not at all the same as looking in *Econometrica* for the right theorem, but neither is it entirely unrelated. This is natural enough: just as chemical engineering is related to but different from chemistry, we can expect "microeconomic engineering" and economic design to be different from but related to game theory. (Recall my 1991 essay Game theory as a part of empirical economics, whose last paragraph reads as follows.)

"... in the long term, the real test of our success will be not merely how well we understand the general principles which govern economic interactions, but how well we can bring this knowledge to bear on practical questions of microeconomic engineering, to design appropriate mechanisms for price formation (as in different kinds of auction), dispute resolution, executive compensation, market organization, etc. To do this we'll need to learn more about the various kinds of frictions that enter economic environments as a function of size and complexity, about which properties of these environments are robust and which are fragile, and about which kinds of environments facilitate which kinds of learning. Just as chemical engineers are called upon not merely to understand the principles which govern chemical plants, but to design them, and just as physicians aim not merely to understand the biological causes of disease, but their treatment and prevention, a measure of the success of microeconomics will be the extent to which it becomes the source of practical advice, solidly grounded in well tested theory, on designing the institutions through which we interact with one another."

As game theorists are increasingly asked to answer design questions, we need to pay attention to good

examples of economic design, in order to start building a sensible, practice oriented literature. This page is meant to take a step in that direction, by pointing out some recent examples.

One difficulty is that, since most design work is done on a consulting basis, the results remain proprietary. But as we see more design of markets, which are at least partially public by their very nature (as opposed e.g. to corporate incentive systems) there is starting to be some open literature describing the results, and the design process. A small amount of material is even starting to be available on the web. In what follows, I'll first give some pointers to work of this sort that I have been retained to do on the National Resident Matching Program, and then some pointers to the fascinating work done by a number of game theorists in connection with the design (and subsequent conduct) of the radio spectrum auctions conducted by the FCC.

● The National Resident Matching Program (NRMP)

The NRMP is the computerized market through which, each year, roughly 20,000 entry level jobs are filled by new physicians. I was retained in 1995 by the NRMP's Board of Directors to direct a review of the design of this market, and to evaluate possible design changes. In order to inform the medical community of this review, and to solicit comments, the Board asked me to post a description of the study and its progress on the web. (Of course comments and suggestions from economists are also welcome.) Some background information, the study design, and my first few interim reports are here: [Design Review of the National Resident Matching Program](#). The final report for this project, reporting the design of the new algorithm and the study comparing it to the existing algorithm, is here: [Report on the design and testing of an applicant proposing matching algorithm, and comparison with the existing NRMP algorithm](#)

Since the theory of two-sided matching markets is one of the most thoroughly developed areas of game theory (recall the extensive [bibliography](#)), it is notable that in a study of this kind there will nevertheless be a lot of questions whose answers cannot be found in the literature. There are two reasons for this. The first, and less important reason, is that the market has many special features, introduced in the last decade, which are not handled in the existing literature. More importantly is that while the existing theory is very good at telling us that certain kinds of things can never happen, and that others must always happen, it gives little guidance about the *frequency* with which we can expect to see things which can sometimes happen. For this, an important tool will be computational experiments which use as input the data from recent matches. This is what gives some of the "engineering" flavor to this kind of work, and distinguishes it from game theory as practiced in the journals.

Much of the work in this study I am directing is being carried out by [National Matching Services Inc.](#) (Of the various organizations or individuals I know of which organize and conduct centralized matches, NMS is by far the largest; it presently runs or supports the matches which organize a number of healthcare and legal markets.)

● The FCC spectrum auction

Another area in which game theory is well developed is in the study of auctions, but auction design is also an area in which there is a need to supplement the standard theory.

Here are some newspaper and magazine articles describing the work of game theorists in setting up the auctions which the Federal Communications Commission conducts to allocate parts of the radio spectrum for various uses.

Business Week, March 14, 1994 describes the origin of the FCC Auctions in an article called [WHAT PRICE AIR?](#)

The San Diego Daily Transcript published a story, focusing on the work of John McMillan for the FCC, called [Airwaves Auction Like The Second Calif. Gold Rush: UCSD Professor Is Hired By FCC To Help Design System](#)

The Stanford Business School magazine published an interview with Paul Milgrom focusing on his work with Bob Wilson on these auctions [FCC spectrum auctions](#), and Milgrom has a new book on the subject, [Auction Theory for Privatization](#)

For the official auction rules, see the FCC's [Competitive Bidding 5th Report & Order](#), and for results of these auctions, see the FCC's [Auction page](#).

A number of papers have started to be written about the auction and its design process, see a brief [FCC auction bibliography](#).

An article which touches on some of the gaming associated with the previous systems of spectrum allocation is

Blake, Jonathan [FCC Licensing: From Comparative Hearings to Auctions](#), Federal Communications Law

Journal, v47, December 1994.

Another article from the same issue of that journal considers the auctions in the larger framework of spectrum policy: Obuchowski, Janice [The Unfinished Task of Spectrum Policy Reform](#)

The New Zealand Ministry of Commerce has put out a [Radiocommunications Act Review](#) which includes a section on [Spectrum auctioning](#) as well as some good background on the problems of efficiently defining and allocating rights to the broadcast spectrum.

● **Design considerations for internet and other electronic markets**

There are lots of open design problems connected with running electronic markets of all sorts, and naturally there's a lot of material on the web. For starters, see the collection of [Network Payment Mechanisms and Digital Cash](#) maintained by Michael Pierce. In a related vein, Roy Davies has a page which includes a lot of material on [Electronic Money](#).

[Hal Varian](#) maintains a comprehensive page on [The Information Economy](#), which contains a lot of design-relevant material, including many of Hal's own papers (some of which can also be accessed on the page of his coauthor [Jeffrey Mackie-Mason](#), who also maintains an impressive collection of network links. Another comprehensive page, on [Economics of Networks](#) is maintained by Nicholas Economides; it also includes many of his own papers.

● **Miscellaneous design projects (including some experiments)**

[Robin Hanson](#) is an aspiring market designer who describes a number of design ideas (from systematic prizes for scientific progress, to a market for idea futures, which also has a site at which you can [trade idea futures](#) for fun.

As new markets are designed, experiments will have a natural role to play, as scale model tests of their operating characteristics, and even as demonstrations to skeptical patrons and potential users. (The use of experiments as demonstrations gives economists a concrete and compelling way to communicate with non-economists, in a way that theorems about equilibrium behavior, for example, do not.) Two brief descriptions of this latter use of experiments are found in [John Ledyard](#)'s description of his work on an allocation mechanism for the space station, and the Progress and Freedom Foundation's report on a demonstration they received at Arizona on [Experimental Economics in Electric Power Deregulation](#).

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Other labs and experimenters

- [Center for Research in Experimental Economics and Political Decision-Making](#) at the University of Amsterdam.
- [Economic Science Lab at the University of Arizona](#).
- [Experimental Economics Project at the University of Bonn](#), (which is part of the [Economic Theory](#) project) directed by [Professor Reinhard Selten](#). (They make available some of their [basic experimental software](#).)
- The Laboratory for Experimental Economics and Political Science at Cal Tech, directed by [Charlie Plott](#), will soon have an exciting web page.
- Dan Friedman and his colleagues at the University of California, Santa Cruz, have some pages on [Learning and Experimental Economics](#).
- [Experimental Economics Laboratory at the University of East Anglia](#) Bob Sugden, Chris Starmer, Judith Mehta, Robin Cubitt, and Alistair Munro are here.
- On Sunday, 25 June 1995, I had the privilege of participating in the inauguration of the new experimental lab at the [Hebrew University of Jerusalem--RatioLab](#). The directors are Professors Gary Bornstein, Eyal Winter, and Shmuel Zamir. [Yishay Mor](#) has some papers and a bibliography of prisoner's dilemma there.
- There is a very active experimental group at the University of Iowa, but there doesn't seem to be a web location with any of their papers up right now.
- Ken Clark and Martin Sefton have a page on the [Experimental Research at the University of Manchester](#) where they have data and instructions from some of their experiments, as well as abstracts of the papers.
- [Experimental Economics Laboratory at McMaster University](#) is directed by Stuart Mestelman and Andrew Muller.
- [Experimental Economics Research Program at the University of New Mexico](#). Mike McKee, Philip Ganderton, David Brookshire, Bob Berrens, and Stuart Burness are here.
- [Tatsuyoshi Saijo](#) at Osaka University makes some of his papers available, in English and Japanese.

- Glenn Harrison at the University of South Carolina has started to put some information up on his page.
- Timothy Cason at the University of Southern California has abstracts of some of his experimental papers up on his page.
- John Van Huyck at Texas A&M University has been doing a lot of interesting work much of which is now available on his Game Theory and Experimental Economics page. He has also started an Economic Science Forum in which experimenters are invited to post and reply to queries, comments, announcements, etc.
- Computable and Experimental economics lab at the University of Trento.
- Experimental Economics and Applied Game Theory at the University of Wyoming.
- Experimental economics listserver, set up by the Centre of Experimental Economics at the University of York.
- Centre for Experimental Economics at the University of York. (So far this location just contains the contact addresses for the directors, John Hey and Graham Loomes...)
- Ernst Fehr and Bruno Frey at the University of Zurich have both begun to put information on the web. There isn't much online yet, but lots of good work is being done there.

For names and addresses of experimental economists, a good source is the

- Economic Science Association directory maintained by Bob Forsythe at the University of Iowa.

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Things to participate in:
Experiments on the web, tournaments, conferences

Experiments on the web

- Iowa electronic markets, trade a variety of contracts, both financial and political, which change over time. One of the research interests of this long running set of investigations is the ability of markets to forecast events. (See also the related Austrian Political Stock Markets in Vienna, and UBC Election Stock Markets in Canada.)

Tournaments

- IIASA's Tournament of Learning to Play Games, submit a strategy and a game. [no longer taking submissions; results still to be announced]

Conferences

- DIMACS Workshop on Economics, Game Theory, and the Internet, Rutgers, April 18-19 1997.
- Bonn Workshop 1997: Theories of Bounded Rationality May 6-10, 1997.
- Sixth Viennese Workshop on Optimal Control, Dynamic Games and Nonlinear Dynamics: Theory and Applications in Economics and OR/MS Vienna, May 21-23, 1997
- The 8th Jerusalem Summer School in Economic Theory, on General Equilibrium: The Causes & Consequences of Incomplete Markets 16-25 June, 1997, Director: Kenneth J. Arrow; Coordinator: Motty Perry.

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Experiments in the Classroom

A newsletter devoted to bringing experiments into the classroom for instructional purposes, Classroom Experiments is published by Greg Delemeester at Marietta College in Ohio, and John Neral at Frostburg State University in Maryland. At the moment hardcopy issues are distributed free of charge. John Neral's email address is e2ecner@fre.fsu.umd.edu

The Fall 1993 issue of the Journal of Economic Education is concerned with classroom experiments.

A nice description of studying experimental economics, from an exciting new textbook Experiments with Economic Principles by Ted Bergstrom and John Miller, is

"Taking a course in experimental economics is a little like going to dinner at a cannibal's house. Sometimes you will be the diner, sometimes you will be part of the dinner, sometimes both."

Their page describes the book, and includes an experiment programmed in Java for you to try. [Return to Table of Contents.](#)

Other pages on which game theory intersects with experiments

- [John Duffy](#) at Pitt.
- [Drew Fudenberg](#) at Harvard.
- [David Levine](#) at UCLA.
- [Richard McKelvey](#) at Cal Tech. His page includes not only some of his papers, but also computer programs for analysing various kinds of equilibria.
- Ken Binmore is director of a project called [Economic Learning and Social Evolution](#).
- The [Center For Rationality and Interactive Decision Theory At the Hebrew University of Jerusalem](#), directed by [Sergiu Hart](#), has a page which lists their papers and email addresses, and briefly describes some of their activities, including their experimental lab, [RatioLab](#), and "Beehave", the bee behavior laboratory, opened in 1994, which uses bumblebees foraging on artificial flowers as a model system to study interactive decision-making in animals.
- The [International Journal of Game Theory](#) has now started a home page at which you can browse recent and not so recent abstracts, and get editorial information. [Games and Economic Behavior](#) also now has a web page at which you can see contents and abstracts.

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Evolution, learning, and dynamics

- [Ted Bergstrom](#)'s page has some papers on evolutionary models, and on matching models of the economics of the family.
- [John Miller](#) is a longtime student of adaptive models. (His page even includes a very simple experiment you can participate in, which might get you thinking about how to do experiments on the net.)
- [Avner Shaked](#)'s project on [Systems of Local Interaction with Incomplete Information and Bounded Rationality](#) at Bonn explores a variety of approaches. (Click on "[Members](#)" for the home pages of other members of this project.)
- [Birgitte Sloth](#)'s page includes some abstracts of her papers on learning.
- [Leigh Tesfatsion](#) is interested in computational models of learning and adaptation (and her work in this area intersects with the two-sided matching literature). She also maintains a page on [Agent-Based Economics](#) concerning evolutionary and artificial-life models of economic environments.
- [Signalling Theory and Animal Communication](#) is a page in which evolutionary game theory is used to discuss issues in biology.
- [Dynamics of Multiagent Systems](#) at Xerox PARC has papers on a number of game-theoretic issues (coordination, cooperation, social dilemmas) which arise in distributed computing (and which are approached via models of dynamics).
- [Kjell Hausken](#) at the Max Planck Institute for the Study of Societies, in Cologne has a number of papers in this general area also.

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Game theory in the classroom

(This section is still very much in progress--suggestions are welcome.)

- Martin Osborne has, among other interesting items, corrections to his two textbooks coauthored with Ariel Rubinstein.
- Jim Ratliff's Game Theory Resources on the Net includes a variety of classroom material, as well as other links.
- Adam Brandenburger and Barry Nalebuff have put up a page for their new book about business and game theory, Co-opetition. Their page also contains an interesting collection of newspaper and magazine articles touching on game theory, the Nobel prize, etc.

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Other servers devoted to game theory

For Paul Walker's outline History of game theory see

- history of game theory. (at Drexel, which also has some other game-theoretic material on its server, maintained by Roger McCain), or in New Zealand (the original) at
- history of game theory.

Some game theory with connections to operations research can be found at

- Combinatorial Game Theory, a page maintained by Daniel Loeb at the University of Bordeaux, and Combinatorial Game Theory maintained by David Eppstein at UC Irvine.
- International Society of Dynamic Games, with issues of their newsletter, and links to some members and officers at Helsinki University of Technology and elsewhere. Tamer Basar includes some links to the prefaces and contents of the books he has written and edited.

Some game theory news and internet links are found at the

- Interuniversity Centre for Game Theory and Applications in Italy.

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Miscellaneous game theory connections

Sylvia Nasar of the NY Times wrote a moving story about John Nash on the occasion of his sharing the Nobel Memorial Prize in Economic Science in 1994 with John Harsanyi and Reinhard Selten. The Nobel link includes brief autobiographies of all three laureates. A story focusing on a speech Nash gave about his illness and recovery appeared in The Times of London on August 28 1996.

Another giant of modern game theory is **Robert Aumann**, whose work and professional life are discussed in connection with a volume edited in his honor by Sergiu Hart and Abraham Neyman as part of his 65th birthday celebration in June 1995.

A number of game theory papers and abstracts are available from the webpage of the CentER for Economic Research at Tilburg.

Ian Ayres at the Yale Law School employs game theory to argue about (among other things) discrimination and diversity, including applications to the FCC auction, and to a field experiment concerning bargaining in the automobile market.

There is also a book on Game Theory and the Law by Baird, Gertner, and Picker.

Rebecca Morton at the University of Iowa applies game theory to political science.

Some game theory papers can be found on the home pages of Michael Chwe (an economist at Chicago), and Daphne Koller (a Stanford computer scientist, whose game theory papers are joint work with Nimrod Megiddo (their papers are retrievable from Nimrod's page too, under "publications").) George Mailath and

Stephen Morris at Penn have some of their papers posted on the web. Robert Nau, at Duke, has some papers on common beliefs and correlated equilibria. Eric Rasmusen, at the Indiana University School of Business, has some papers, abstracts, and material from his textbook. William Thomson, at the University of Rochester, has put the abstracts of a number of his papers up on the web.

A page on the work of the sociologist Jon Elster is maintained by Hans Olav Melberg. Quite a bit of Elster's work should be of interest to game theorists; see e.g. [Elster, Jon (1982), Marxism, Functionalism, and Game Theory: The Case for Methodological Individualism, Theory and Society 11:453-482. I am an admirer of Elster's work on institutions of local justice, and wrote a book review of his first book on the subject.

An interesting page on Machine Learning in Games is maintained by Jay Scott at Swarthmore. Some machine learning with a game-theoretic flavor, applied to the game of bridge, is discussed by Ian Frank in Scotland.

In their pages on Drama Theory Nigel Howard and Jim Bryant and their colleagues seek to generalize game theory "by applying the metaphor of drama to human interaction."

There's even a **band** named Game Theory.

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Searchable NSF grant abstracts



Search NSF Award Abstracts is a searchable set of grant awards from the (U.S.) National Science Foundation, containing the abstracts of funded grants (and basic info on the PI and budget), from 1989. If you search with a term like "game theory" or "experimental economics" you will recover a lot of the grants you would expect, along with some others. (Or try searching on conjunctions like "experiment AND game".) You can also try to search by name of the principal investigator. (For name searches, conjunctions are especially helpful: e.g. to look for abstracts of Adam Smith's recent grants you do better to search on "Adam AND Smith" than on "Adam Smith")

The abstracts don't provide enough detail to give you real insight into the research, but the collection of funded grants gives an interesting window on what is selling to arguably the most important funder of basic economic research.

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Working Paper Archive

There is a general Economics Working Paper Archive maintained at Washington University in St. Louis by Bob Parks and Larry Blume, at which papers can be deposited and recovered. This is a really fine idea, which will catch on as we all become more computer friendly (and vice versa). Readers of this page may wish to look at (and contribute to) the sections on Games and Information, and on Experimental Economics. See also the (searchable) collection of working papers, working paper bibliographies, and software at NetEc.

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Conduct of Science

In the general scientific community, particularly in the highly competitive (for credit, for grants, etc.) biological sciences, there has started to be a good deal of discussion about what constitutes improper conduct in (and of) science. Not surprisingly, it turns out to be hard to set simple rules for complex matters. But the occasional hair-raising abuse makes it clear that we have an obligation to at least think about these issues (and make sure that our graduate students are aware of them).

The following links are discussions of scientific conduct. While the examples aren't drawn from economics, some of the issues (such as the allocation of credit among researchers) will be relevant even to theorists, and many more will be relevant to experimenters and other empirical types.

- [AAAS page on Conduct in Science](#). See also the provocative editorial [Ambiguity in the Practice of Science](#) by Frederick Grinnell, in the 19 April 1996 issue of *Science*.
- [On Being A Scientist: Responsible Conduct In Research](#) Committee on Science, Engineering, and Public Policy, of the National Academy of Sciences, National Academy of Engineering, and Institute of Medicine.

See also my paper, "[Let's Keep the Con Out of Experimental Econ.](#)".

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Curriculum vita, and consulting services--Alvin E. Roth

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[Consulting services.](#)

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This page was initially constructed in June, 1995 by my (then 11 year old) computer guru, [Aaron Roth](#), who does pages for a modest emolument.

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